

- (b) I. If a total of 33MHz of bandwidth is allocated to a particular FDD cellular telephone system which uses two 25kHz simplex channels to provide full duplex voice and control channels, compute the number of channels available per cell if a system uses (i) 4 cell reuse (ii) 7 cell reuse (iii) 12 cell reuse. **03**
- II. Consider a cellular system with hexagonal cells of radius $R = 1$ Km. Suppose the minimum distance between cell centers using the same frequency must be $D = 6$ Km to maintain the required signal- to-noise-plus-interference power ratio. **04**
- (i) Find the required reuse factor N and the number of cells per cluster.
- (ii) If the total number of channels for the system is 1200, find the number of channels that can be assigned to each cell.
- (iii) Sketch two adjacent cell clusters and show a channel assignment for the two clusters with the required reuse distance.

OR

- Q.5 (a)** A Cellular service provider decides to use a digital TDMA scheme which can tolerate a signal to interference ratio of 15 dB in the worst case. Find the optimal value of N for (i) Omni - directional antennas, (ii) 120° sectoring , and (iii) 60° sectoring. Should sectoring be used? If so, which case (60° or 120°) should be used? (Assume a path loss exponent $n = 4$ and consider the trucking efficiency) **07**
- (b) If a signal to interference ratio of 15 dB is required for satisfactory forward channel performance of a cellular system, what is the frequency reuse factor and cluster size that should be used for maximum capacity if the path loss exponent is (i) $n = 4$, (ii) $n = 3$? **07**
- Assume that there are 6 co-channels cells in the first tier, and all of them are at the same distance from the mobile. Use suitable approximations.
